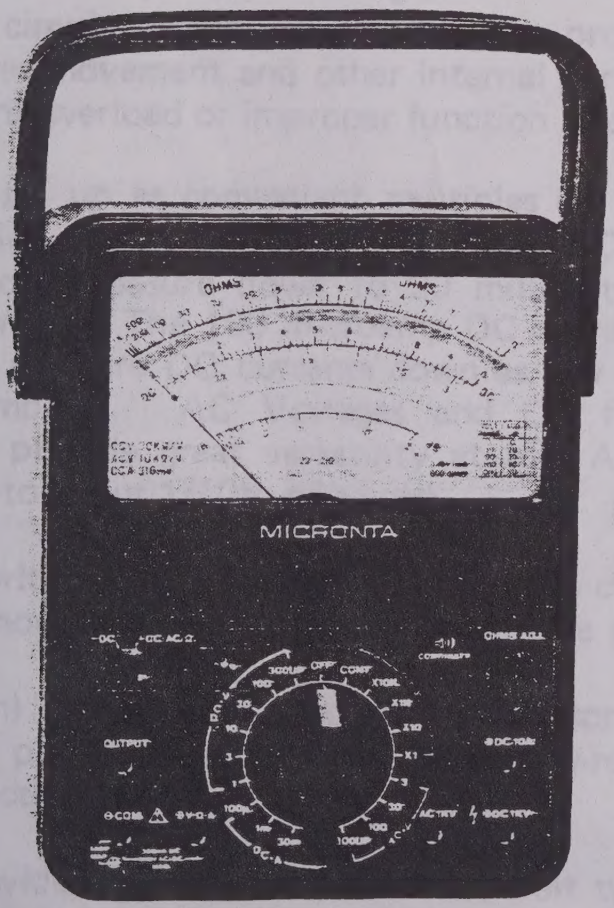
MICRONTA®

30,000 OHMS/VOLT MULTITESTER

INSTRUCTION MANUAL

CAT. NO. 22-210



CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION

This sensitive Multitester is designed to measure AC and DC voltage, DC currents and resistance -- with accuracy and ease. The 5" (12 cm), sensitive meter incorporates a mirrored-scale for accurate readings and uses 3 colors for rapid scale identification. An "off" position is incorporated for meter protection during transit. This instrument will provide many years of accurate voltage, current and resistance measurements.

We've incorporated a special audible continuity function. When using this function, the built-in buzzer will sound when the circuit continuity is approximately 300 ohms (or less).

The meter circuit incorporates a fuse to protect the delicate meter movement and other internal parts in case of inadvertent overload or improper function selection.

Ranges are set up as convenient multiples of 1 and 3. With the high-sensitivity 1 volt full-scale DC voltage range, you can measure down to 20 millivolts of DC voltage (+ or —). The 100 microamp DC current range will let you measure DC currents down as low as just a few microamperes. AC Voltages and DB functions combine to provide great versatility at low AC signal levels (down to about 1/10th of a volt).

The DC polarity switch makes it convenient to check DC voltages without switching leads for opposite polarity.

47" (120 cm) well-insulated test leads with spring-steel banana-type plugs result in firm, safe, low-resistance circuit connections.

Power is provided by 2 batteries — a 1½-Volt type "C" for the R x 1, R x 10, R x 1K Ranges and a 9-Volt rectangular type for R x 10K and CONT. Ranges.

SPECIFICATIONS

RANGES	27
DC Voltage	0-1-3-10-30-100-300-1000 Volts
AC Voltage	0-3-30-100-300-1000 Volts
DC Current	0-100μ-1-30-300m-10A
Resistance	0-1-10K-1-10meg (Center scale 10) Continuity 0 — 300 ohm Approx.
Decibels	—20 to + 62 in 5 ranges
Output	0-3-30-100-300-600 Volts
ACCURACY	
DC Voltage	±3% of full scale
AC Voltage	±4% of full scale
Frequency response	
45 Hz to 1 KHz	± 1% up to 30V
to 10 KHz	± 3% up to 30V
Resistance	±3% of scale length on Resistance
SENSITIVITY	DC: 30,000 ohms/volt AC: 10,000 ohms/volt
METER MOVEMENT	5" (12 cm), 3-color, mirrored scale, 25μamp full scale
BATTERIES	Requires one type "C" battery and one 9-volt rectangular type
LEADS	47" (120 cm) spring-steel, banana-plug style
FUSE	0.5A, 250V
SIZE	7" x 5-1/2" x 3-1/8" (HWD) (18 x 14 x 8 cm)
WEIGHT	850 g

EXPLANATION OF CONTROLS AND MARKINGS

1. **Range Switch** – use the position that will result in a meter reading in the upper 1/3rd of the scale.

2. **–DC/+DC·AC·Ω** – is the polarity reverse switch. Set to **+DC·AC·Ω** when measuring all but "–DC" currents and voltages.

3. **OHMS ADJ** – use this control to set meter reading to "0" on the green OHMS scale when using the resistance function (with meter probes connected together).

4. **Jacks** – use ⊖ **COM** and ⊕ **V-Ω-A** unless you are measuring high DC or AC voltages. When measuring DC or AC voltages of 300-1000 volts, use ⊖ **COM** together with ⊕ DC 1KV or AC 1KV. For DC currents of 300 milliamperes up to 10 ampers, use the ⊕ DC 10A jack together with the ⊖ **COM** jack.

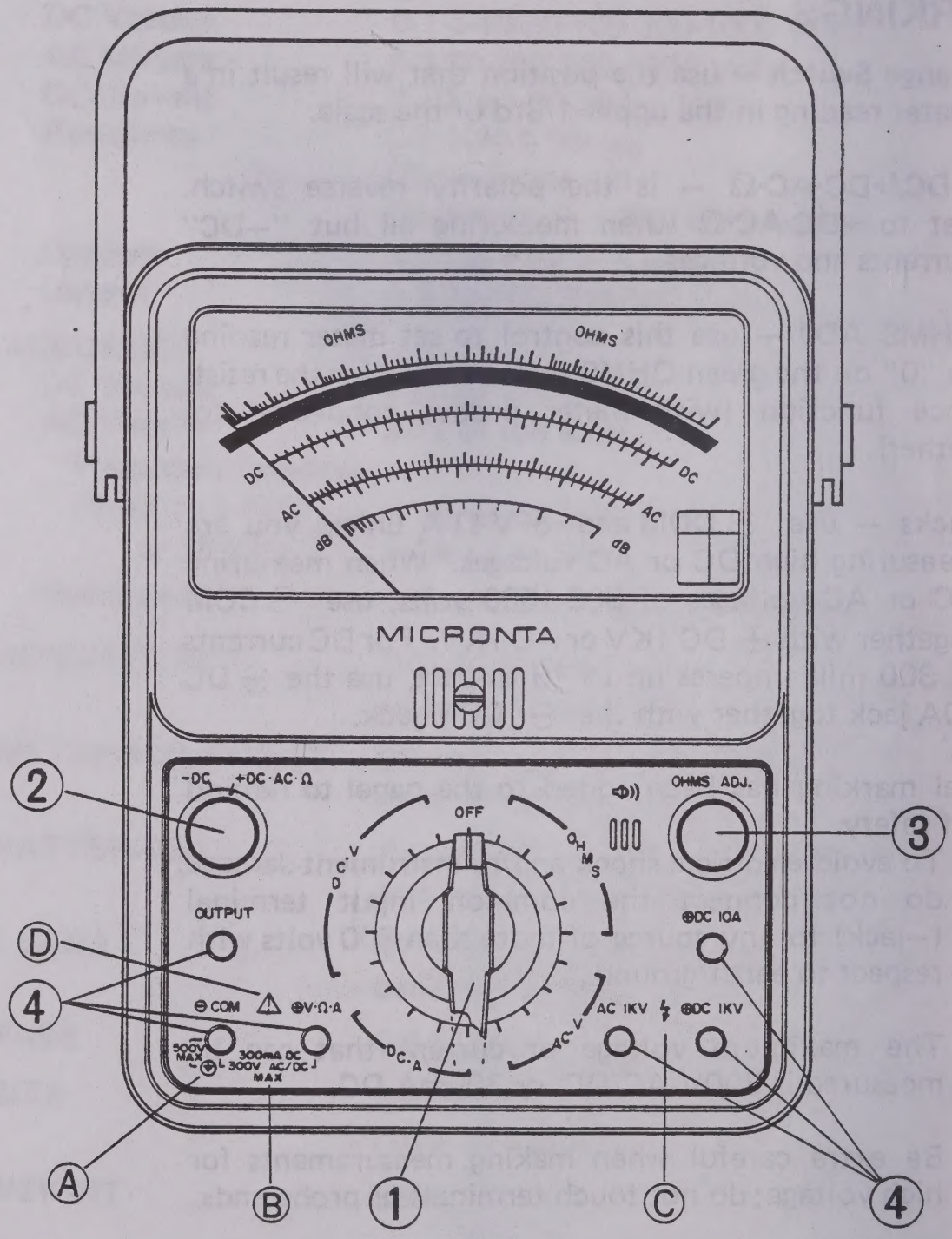
Special marking has been added to the panel to remind you of safety.

A. 500V MAX ⏚ To avoid electrical shock and/or instrument damage, do not connect the common input terminal (–jack) to any source of more than 500 volts with respect to earth/ground.

B 300mA DC 300V AC/DC MAX The maximum voltage or current that can be measured is 300V AC/DC, or 300mA DC.

C. ϟ Be extra careful when making measurements for high voltage; do not touch terminals or probe ends.

D. ⚠ Refer to complete operating instructions.


OHMS
OHMS
DC
AC
dB
DC
AC
dB
MICRONTA
-DC
+DC·AC·Ω
OFF
OHMS ADJ.
OUTPUT
⊕DC 10A
⊖COM
⊕V·Ω·A
AC 1KV
⊕DC 1KV
500V MAX
300mA DC 300V AC/DC MAX
DC·V
OHMS
DC·A
AC·V
2
3
D
4
A
B
1
C
4

USING YOUR MULTITESTER

You'll need one 9-volt battery for R x 10K and CONT. Ranges, and one "C" cell for the other resistance ranges. We recommend our 23-583/553 for 9V, 23-581/551 for "C".
Remove the Battery/Fuse Compartment Cover on the rear by loosening the screw and install batteries in the correct Compartment. Be sure to observe proper polarity. Replace Compartment Cover.

For most accurate readings, keep the meter laying flat on a non-metallic surface.
Also, use a Range setting that results in a reading in the upper 1/3rd of the meter scale.

Also, look at the scale from the point where the pointer and its reflection on the mirror come together: otherwise a reading error due to parallax will result.

If the pointer does not normally rest exactly over "0" at the left side of the scale, adjust the plastic screw in the lower center of the meter face to bring the needle to "0".

Always observe correct test lead polarity when making DC measurements: Black into ⊖ **COM** and Red into the ⊕ **V-Ω-A** (or ⊕ **DC 1KV** or **AC 1KV** or ⊕ **DC 10A**) jacks.
The maximum input limit for voltage and current measurement between ⊕ **V-Ω-A** and ⊖ **COM** is 300V AC/DC and 300mA DC.

TEST LEADS

Use only the same type of test leads as are supplied with your unit. These test leads are rated for 1000 volts; replacements are available from your local Radio Shack store.

DC VOLTAGE MEASUREMENTS

WARNING ⚡ : USE EXTREME CARE WHEN MAKING MEASUREMENTS FOR HIGH VOLTAGE; DO NOT TOUCH TERMINAL OR PROBE ENDS.

1. Plug the test leads into the correct jacks — Black into ⊖ **COM** and Red into ⊕ **V-Ω-A.**
2. Set Range Selector to one of the **DCV** positions; it is best to start at the top and work down. Set the polarity-reversal switch to **+DC·AC·Ω.**
3. Connect the test probe tips to the circuit under test. If the meter reads backwards, set the polarity-reversal switch to **—DC.**
4. Set Range Selector as required to obtain a meter reading in the upper 1/3rd of the meter scale.
5. Read the voltage on the black DC scales.
6. For voltages between 300 and 1000 volts, plug the Red test lead into the ⊕ **DC 1 KV** jack. **Use extreme care when using this high-voltage range.**
   NOTE: The ⊕ **DC 1 KV** jack is for use only with DC voltages of 300 to 1000 volts.

AC VOLTAGE MEASUREMENTS

WARNING ⚡ : USE EXTREME CARE WHEN MAKING MEASUREMENTS FOR HIGH VOLTAGE; DO NOT TOUCH TERMINAL OR PROBE ENDS.

1. Plug the test leads into the correct jacks — Black into ⊖ **COM** and Red into ⊕ **V-Ω-A.**
2. Set Range Selector to one of the **ACV** positions; it is best to start at the top and work down. Set the polarity-reversal switch to **+DC·AC·Ω.**
3. Connect the test probe tips to the circuit under test. Set Range Selector as required to give a meter reading in the upper 1/3rd of the meter scale.
4. Read the voltage on the red **AC** scale.

5. For voltages between 300 and 1000 volts, plug the Red test lead into the AC 1KV jack. **Use extreme care when using this high-voltage range.**

NOTE: The AC 1KV jack is for use only with AC voltages of 300 to 1000 volts.

DC CURRENT MEASUREMENTS

WARNING: DO NOT APPLY VOLTAGE TO MEASURING TERMINAL WHILE RANGE SWITCH IS IN CURRENT POSITION.

1. Plug the test leads into the correct jacks — Black into ⊖ COM and Red into ⊕ V-Ω-A.
2. Set Range Selector to the 300m (10A) DC A position. Set the polarity-reversal switch to +DC·AC·Ω.
3. Open up the circuit in which you want to measure current and connect the Black test probe to the negative side and the Red to the positive side of the circuit.
4. Apply power to the circuit under test. Set Range Selector to a position which will give a meter reading in the upper 1/3rd of the scale. Read current on the black DC scale.
   If the meter reads backwards, set polarity-reversal switch to — DC.

NOTE: Do not attempt to read AC current.

NOTE: If the current will be greater than 300 milliamps, plug the Red test lead into the ⊕ DC 10A jack.

RESISTANCE MEASUREMENTS

WARNING: DO NOT APPLY VOLTAGE TO MEASURING TERMINALS WHILE RANGE SWITCH IS IN OHMS POSITION.

Before taking any resistance measurements, disconnect power to the unit under test and discharge capacitors. It is best to remove batteries and unplug line cords.

1. Plug the test leads into the proper jacks – Black to ⊖ **COM** and Red to ⊕ **V-Ω-A.** Set polarity-reversal switch to **+DC·AC·Ω.**
2. Set Range Selector to one of the **OHMS** positions; touch the probe tips together and adjust **OHMS ADJ.** control to bring the pointer to the "0" on the top OHMS scale (green).
3. Now, connect the probe tips across the circuit or part under test. When measuring resistance, it is best to disconnect one side of the part under test (thus the remainder of the circuit will not interfere with the reading).
4. Read the resistance on the green OHMS scale; use the proper multiplier to obtain the correct value (R "times" 1, 10, 1,000, 10,000 depending on the position of the Range Selector).
5. CONT. position is for continuity checking. When resistance is 0 to 300 ohms, the built-in buzzer sounds. The level of sound reduces as the resistance increases.

NOTES: When you are unable to adjust the pointer to "0" on the OHMS scale in the R x 1, R x 10 or R x 1K position, the 1.5-volt C cell battery must be replaced.

When you are unable to adjust the pointer to "0" on the OHMS scale in the R x 10K position, or the continuity buzzer does not sound in the CONT. position when leads are shorted, the 9-volt battery must be replaced.

The polarity-reversal switch must be left in the **+DC·AC·Ω** position for all resistance measurements.

DECIBEL MEASUREMENTS

1. Plug the test leads into the proper jacks — Black into ⊖ **COM** and Red into ⊕ **V-Ω-A.**
2. Set Range Switch to one of the **ACV** positions; use a range that provides a meter reading in the upper 1/2 of the meter scale.
3. Read dB on the dB scale, adding the appropriate number of dB to the dB scale reading as noted in the chart at the lower right of the meter face.

NOTE: For absolute dB measurements, circuit impedance must be 600 ohms. 0 dB = 1 milliwatt dissipated in a 600 ohm impedance (equivalent to 0.775 volts across 600 ohms).

OUTPUT VOLTAGE MEASUREMENT

1. To measure AC voltage in the presence of DC voltage, use the OUTPUT function. Connect the Black lead to the ⊖ **COM** jack and the Red lead to the **OUTPUT** jack.
2. Set Function switch to **+DC·AC·Ω** position.
3. Set the Range switch to an **AC V** position and measure the voltage in the circuit.

NOTE: The function incorporates a DC blocking capacitor, rated at 600 volts.
Thus, do not exceed the 600 volts rating when measuring output voltage.

4. Read output voltages on the same scale as for AC voltage.

REPLACEMENT OF BATTERY/FUSE

WARNING: TO AVOID ELECTRIC SHOCK, DISCONNECT MEASURING TERMINALS BEFORE REMOVING BATTERY OR FUSE. REPLACE ONLY WITH SAME TYPE BATTERY OR FUSE. THIS INSTRUMENT CONTAINS NO USER SERVICEABLE PARTS. SCREW REMOVAL BY QUALIFIED PERSONS ONLY. CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE, REPLACE ONLY WITH 0.5A, 250V FUSE.

To install or replace the Batteries/Fuse, loosen the screw on Battery/Fuse Compartment Cover to open.

NOTE: The fuse will blow when voltage is applied in resistance or current mode. In this case there will be no meter movement (Replace the fuse).

1. Disconnect the test leads.
2. Open the Battery/Fuse Compartment Cover.
3. Pull the red ribbon in the Fuse Compartment. The fuse will pop out.
4. Insert a new fuse on the ribbon ring. Use only a fuse of the same type/rating (0.5A, 250V).
5. Install fuse with ribbon in the Fuse Compartment.
6. Close the Battery/Fuse Compartment Cover.

WARNING: DO NOT OPERATE THE UNIT UNTIL THE BATTERY COVER IS IN PLACE AND FULLY CLOSED.

GOOD METER MEASUREMENT PRACTICES

There are some good general rules which apply to the use of electrical meters. Some are common-sense, some are safety precautions and some are just plain good habits to get into.

1. **CAUTION.** There is always the possibility of dangerous voltages being present in any piece of electrical/-electronic equipment. Always use extreme caution when making measurements — high voltage may appear at unexpected points in a suspected defective circuit.

2. When making measurements, never stand on a wet or damp floor. Do not work near (or on) any grounded metal object — for example, a metal work table, metal water or gas pipes, metal electrical conduit. Accidental contact between the grounded metal object and the circuit under test can be lethal.

3. Always use only well insulated test leads. Never use test leads without insulated test prods. Never allow your fingers to touch the bare metal part of the test probes (or circuit points).

4. Never use test leads with frayed or broken insulation; voltages will appear at all exposed contact points on the leads.

5. Never attempt to measure voltages or currents above the specified maximum the meter is designed for; refer to Specifications section (Page 3).

6. For safety's sake, disconnect leads as soon as you've completed measurements.

7. Always turn off the unit's power before connecting test leads. This is especially true when working on circuits with 100 or more volts.

8. Get into the habit of keeping one hand in your pocket when trouble-shooting any equipment containing high voltage circuitry.

9. You should remember that even a small shock can be dangerous, for your body's reaction to a minor shock can cause you to bump or fall against a higher voltage contact.

10. Discharge filter capacitors before connecting test leads; such capacitors can retain hazardous charges in units with high voltage circuits.

11. When making voltage and current measurements always start with the highest range available.

12. Never attempt to measure a voltage when the function is set to resistance or current (it may burn out the meter movement or other circuitry). Never attempt to measure current with the meter set for resistance.

13. Never attempt to measure AC voltages or current with the meter set to a DC mode (meter circuitry can be damaged).

14. Do not attempt to measure RF voltages with the Meter (it can be damaged, or at best the readings will be meaningless).

15. Do not expose your meter to moisture; avoid high humidity and excessive dust and dirt.

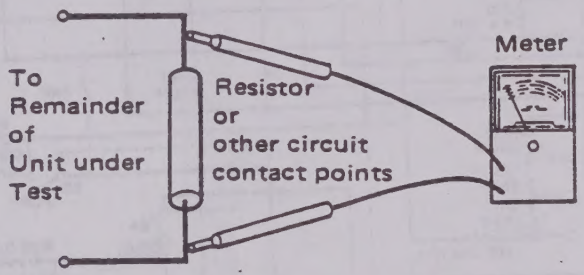
16. Avoid vibration or mechnical shock; the meter might be damaged or its accuracy affected.

17. Avoid using meters in locations with high magnetic fields (inaccurate measurements can result).

18. Remember that voltage and resistance measurements are made with the Meter connected in parallel. Current measurements are made with the meter connected in series.

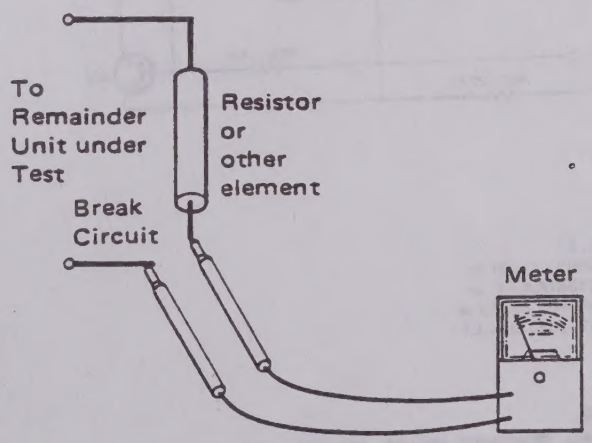
PARALLEL METER CONNECTION

For Voltage and Resistance measurements

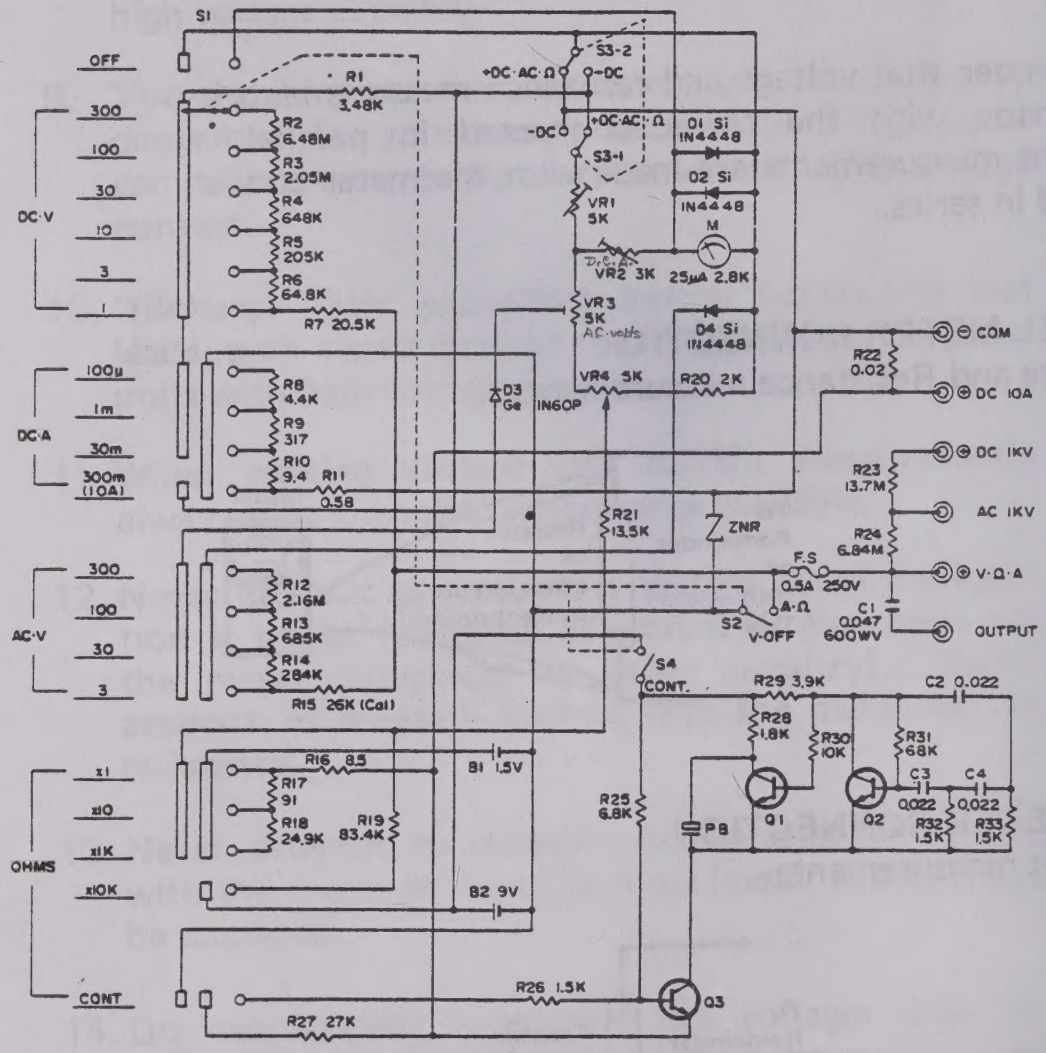


SERIES METER CONNECTION

For Current measurements

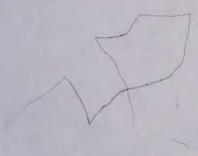


SCHEMATIC DIAGRAM



Q1, 2, 3 :
2SC1815 (Y, GR) or
2SC536 (F, G, H) or
KTN5014 (Y, GR, BL) or
MPS9532 (I, J, K, L)

NOTE
(1) ALL RESISTANCE VALUES ARE INDICATED IN "OHM" (K = 10^3 OHM M = 10^6 OHM)
(2) ALL CAPACITANCE VALUES ARE INDICATED IN "μF"



RADIO SHACK LIMITED WARRANTY

This equipment is warranteed against defects for 90 days from date of purchase. Within this period, we will repair it without charge for parts and labor. Simply **bring your sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover equipment subjected to misuse or accidental damage.

This Warranty gives you specific legal rignts and you may also have other rights which vary from state to state.

We Service What We Sell

RADIO SHACK, A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

AUSTRALIA	BELGIUM	U. K.
280-316 VICTORIA ROAD RYDALMERE, N.S.W. 2116	PARC INDUSTRIEL DE NANINNE 5140 NANINNE	BILSTON ROAD, WEDNESBURY WEST MIDLANDS WS10 7JN

4A2

Printed in Korea

MU-2200210